

4. Explain why direct variation power functions contain the origin but inverse variation power functions do not.
5. Explain why the **reciprocal function** $f(x) = \frac{1}{x}$ is also a power function.
6. In the definition of quadratic function, what is the reason for the restriction $a \neq 0$?
7. The definition of exponential function, $y = ab^x$, includes the restriction $b > 0$. Suppose that $y = (-64)^x$. What would y equal if x were $\frac{1}{2}$? If x were $\frac{1}{3}$? Why do you think there is the restriction $b > 0$ for exponential functions?
8. The vertex form of the quadratic-function equation can be written as

$$y = k + a(x - h)^2 \quad \text{or} \quad y - k = a(x - h)^2$$

Explain why the first form is more useful if you are plotting graphs on your grapher and why the second form is more useful for understanding the translations involved.

9. *Reading Problem:* Clara has been reading her history assignment for 20 min and is now starting page 56 in the text. She reads at a (relatively) constant rate of 0.6 page per minute.
 - a. Find the particular equation expressing the page number she is on as a function of minutes, using the point-slope form. Transform your answer to the slope-intercept form.
 - b. Which page was Clara on when she started reading the assignment?
 - c. The assignment ends at the top of page 63. When would you expect Clara to finish?
10. *Baseball Problem:* Ruth hits a high fly ball to right field. The ball is 4 ft above the ground when she hits it. Three seconds later it reaches its maximum height, 148 ft.
 - a. Write an equation in vertex form of the quadratic function expressing the height of the ball explicitly as a function of time.

- b. How high is the ball 5 s after it was hit?
- c. If nobody catches the ball, how many seconds after it was hit will it reach the ground?

For Problems 11–20, the Quadrant I part of a function graph is shown.

- a. Identify the type of function it could represent.
- b. On what interval or intervals is the function increasing or decreasing and which way is the graph concave?
- c. From your experience, what relationship in the real world could be modeled by a function with this shape graph?
- d. Find the particular equation of the function if the given points are on the graph.
- e. Confirm by plotting that your equation gives the graph shown.

